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CLIPPEDIMAGE= JP403220878A
PAT-NO: JP403220878A
DOCUMENT-IDENTIFIER: JP 03220878 A
TITLE: AUTOMATIC EXPOSURE CORRECTER
PUBN-DATE: September 30, 1991
INVENTOR-INFORMATION:
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ASSIGNEE-INFORMATION:

NAME	COUNTRY
NEC CORP	N/A

APPL-NO: JP02016910
APPL-DATE: January 25, 1990
INT-CL_(IPC): H04N005/238; G03B007/28
ABSTRACT:

PURPOSE: To obtain a picture signal output with a proper exposure in real time by providing a specified value taking a mean luminance around a center of a picture as a reference with respect to any part of the picture so as to apply automatic filtering thereby correcting the exposure .

CONSTITUTION: An analog picture signal from a photodetector 7 is inputted also to a luminance decision section 1 and A/D conversion is applied to the analog picture signal for each picture element unit, the signal is converted into a digital picture data and a high luminance picture element over the specified value of surrounding picture elements is detected and decided by taking the mean luminance around the center of the picture as a reference. The luminance decision section 1 outputs a position data of a high luminance picture element to an LCD control section 2 as a control signal for filtering operation of an LCD 3. That is, the LCD 3 is used to apply filtering to and mask the high luminance part at the specified level or over at the surrounding with respect to the luminance around the center of the optical picture input while the optical picture input at rear light is used as an object.

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⑲日本国特許庁(JP)　⑪特許出願公開

⑫公開特許公報(A)　平3-220878

⑤1Int.Cl.[5]	識別記号	庁内整理番号	⑬公開　平成3年(1991)9月30日
H 04 N 5/238	Z	8942-5C	
G 03 B 7/28		7811-2H	

審査請求　未請求　請求項の数 1　(全3頁)

⑤4発明の名称　自動露出補正装置

⑳特　願　平2-16910
㉒出　願　平2(1990)1月25日

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明　細　書

発明の名称

自動露出補正装置

特許請求の範囲

レンズを介して受光した光画像入力に適正な露出を施した画像信号出力を得る自動露出補正装置において、前記画像信号出力を構成する各画素について画像の中心付近の平均輝度を基準とした規定値を超える高輝度画素を判定しその位置データを出力する輝度判定部と、露出を決定する前記光画像入力に対して前記高輝度画素の位置データに対応する領域にフィルタリングをかけることが可能なLCD(Liquid Crystal Display)と、前記輝度判定部の出力する位置データにもとづいて前記LCDの前記高輝度画素に対するフィルタリング動作を駆動するように制御するLCD制御部とを備えて成ることを特徴とする自動露出補正装置.

発明の詳細な説明

〔産業上の利用分野〕

本発明は自動露出補正装置に関し、特に光学機器における受光入力に対する適正な露出を自動的に施す自動露出補正装置に関する.

〔従来の技術〕

従来、この種の露出補正装置は、第3図に示すとおり、外部からレンズ4を通して入力された光画像入力を偏光プリズム5によって分光し、分光した光画像入力の平均輝度を輝度検出部8にて検出し、その結果により絞り機構6を制御して受光素子7に受光させて露出補正し、画像信号出力を得る構成となっていた.

〔発明が解決しようとする課題〕

上述した第3図に示す従来の露出補正装置は、偏光プリズム5によって分光した外部からの光画像入力をそのまま輝度検出部8へ入力し、その平均輝度に対応して絞り機構6を制御する構成となっているので、外部の光画像入力の位置による輝度差が激しい場合、たとえば逆光状態の場合など

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は、必要な被写体の画像が露出不足となり、真黒になってしまうという欠点がある。

また、上述した露出不足状態を防ぐためには、輝度検出部８に対して人の視感覚及び手動による露出設定を施す必要があり、設定の誤りを免れず、また設定に時間がかかり、タイムリーな対応ができないという欠点がある。

〔課題を解決するための手段〕

本発明の自動露出補正装置は、レンズを介して受光した光画像入力に適正な露出を施した画像信号出力を得る自動露出補正装置において、前記画像信号出力を構成する各画素について画像の中心付近の平均輝度を基準とした規定値を超える高輝度画素を判定しその位置データを出力する輝度判定部と、露出を決定する前記光画像入力に対して前記高輝度画素の位置データに対応する領域にフィルタリングをかけることが可能なＬＣＤと、前記輝度判定部の出力する位置データにもとづいて前記ＬＣＤの前記高輝度画素に対するフィルタリング動作を駆動するように制御するＬＣＤ制御部とを備えて構成される。

〔実施例〕

次に本発明について図面を参照して説明する。

第１図は本発明の自動露出補正装置の一実施例のブロック図、第２図は第１図の実施例における外部光画像入力に対するＬＣＤ動作の一例を示す説明図である。第１図中、太線で示す部分が本発明に直接かかわる部分であり、他は第３図と同一内容の構成である。

外部からの光画像入力は、レンズ４を通して偏光プリズム５へ入力される。偏光プリズム５は画像信号を絞り機構６に出力するとともに露出制御のために光画像入力をＬＣＤ３に分光出力する。絞り機構６に分光された画像信号は、ＣＣＤを利用する受光素子（ＣＣＤ）７へ受光され、画像信号出力を得る。本実施例においては、受光素子７からのアナログの画像信号を輝度判定部１にも入力し、輝度判定部１では、このアナログの画像信号を画素単位ごとにＡ－Ｄ変換を行ない、ディジタル画像データに変換後、画像の中心付近の平均輝度を基準として、周辺画素の規定値以上の高輝度画素を検出・判定する。輝度判定部１は、この高輝度画素の位置データをＬＣＤ３のフィルタリング動作のための制御信号としてＬＣＤ制御部２へ出力する。

ＬＣＤ制御部２は、輝度判定部１からの位置データによって、その位置データによって指定される領域に対応したＬＣＤ３の領域をフィルタリング動作（マスク）するようにＬＣＤ３を駆動する。ＬＣＤ３は、偏光プリズム５と輝度検出部８の間に設置され、偏光プリズム５からの露出用の光画像入力に対してフィルタをかけるように動作する。

第２図は第１図の実施例におけるＬＣＤ３のフィルタリング動作の説明図である。第２図は逆光状態における光画像入力１０を対象とし、光画像入力１０の中心付近の輝度に対する周辺の規定値以上の高輝度部分とＬＣＤ３によりフィルタリングし、斜線を施す部分のＬＣＤ３フィルタリング領域をフィルタリングによりマスクする。輝度検出部８は、逆光状態の場合でも画像の中心付近の必要な被写体１３に適正な露出となるように絞り機構６を制御し、適正露出の下での画像信号出力１２を得ることができる。

〔発明の効果〕

以上説明したように本発明は、画像のいかなる部分に対しても画像の中心付近の平均輝度を基準とした規定値を設けて自動的にフィルタリングをかけて露出補正することにより、人の設定によらず、リアルタイムで適正な露出の画像信号出力を得ることができる効果がある。

図面の簡単な説明

第１図は本発明の自動露出補正装置の一実施例のブロック図、第２図は第１図の実施例における外部光画像入力に対するＬＣＤ動作の一例を示す説明図、第３図は従来の露出補正装置のブロック図である。

１…輝度判定部、２…ＬＣＤ制御部、３…ＬＣＤ、４…レンズ、５…偏光プリズム、６…絞り機

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積、7…受光素子、8…輝度検出部。

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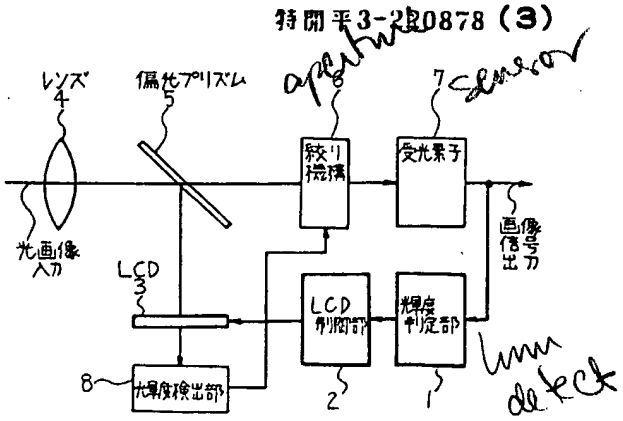
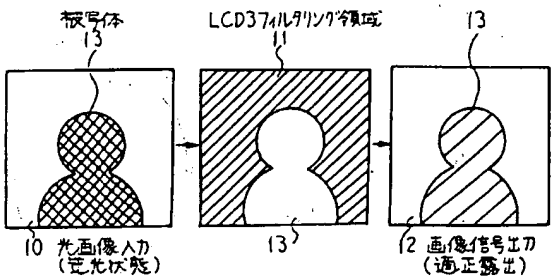
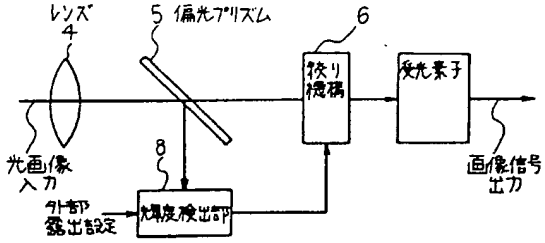


第1図



第2図



第3図

11/04/2001, EAST Version: 1.02.0008

PTO 02-3521

Japanese Kokai Patent Application
No. Hei 3[1991]-220878

AUTOMATIC EXPOSURE CORRECTOR

Shuji Hisatomi

UNITED STATES PATENT AND TRADEMARK OFFICE
WASHINGTON, D.C. JULY 2002
TRANSLATED BY THE RALPH MCELROY TRANSLATION COMPANY

JAPANESE PATENT OFFICE
PATENT JOURNAL (A)
KOKAI PATENT APPLICATION NO. HEI 3[1991]-220878

Int. Cl.[5]:	H 04 N 5/238 G 03 B 7/28
Sequence Nos. for Office Use:	8942-5C 7811-2H
Filing No.:	Hei 2[1990]-16910
Filing Date:	January 25, 1990
Publication Date:	September 30, 1991
No. of Claim:	1 (Total of 3 pages)
Examination Request:	Not filed

AUTOMATIC EXPOSURE CORRECTOR

[Jido roshutsu hosei sochi]

Inventor:	Shuji Hisatomi
Applicant:	NEC, Corp.

[There are no amendments to this patent.]

Claim

An automatic exposure corrector characterized in that in an automatic exposure corrector in which an appropriate exposure is applied to an optical image input received through a lens in order to obtain an image signal output, a luminance determination unit which identifies pixels having a high luminance in excess of a value prescribed in reference to the mean luminance near the center of the image among the respective pixels constituting the aforementioned image signal output and outputs data on their positions, an LCD (Liquid Crystal Display) capable of filtering the areas for the aforementioned optical image input, regarding which the exposure is to be decided, which correspond to the aforementioned high luminance pixel position data, and an LCD controller which performs an operation to drive the filtering operation applied to the

aforementioned high luminance pixels of the aforementioned LCD based on position data output from the aforementioned luminance determination unit are provided.

Detailed explanation of the invention

Industrial application field

The present invention pertains to an automatic exposure corrector. More specifically, it pertains to an automatic exposure corrector which applies an appropriate exposure automatically to an optical input in optical equipment.

Prior art

As shown in Figure 3, a conventional exposure corrector of this type has a configuration in which input of an optical image from the outside through lens 4 is split into beams using polarizing prism 5, the mean luminance of the split optical image input is detected by luminance determination unit 8, and aperture mechanism 6 is controlled according to the result to have [the image] received by light-receiving element 7 for exposure correction in order to obtain an image signal output.

Problems to be solved by the invention

Because the aforementioned conventional exposure corrector in Figure 3 is configured such that the optical image input from the outside which is split by the polarizing prism is directly input into luminance determination unit 8 as is, and aperture mechanism 6 is controlled according to its mean luminance, the photographic image is not exposed sufficiently when the luminance fluctuates severely depending on the position of the external optical image input, for example, when taking a picture facing [bright] light, resulting in the shortcoming that it appears in pitch-black.

In addition, because the exposure needs to be set manually by eye for luminance determination unit 8 in order to prevent the aforementioned insufficient exposure, a setting error is inevitable. There are also problems that the setting takes time, and that the action can not be taken in a timely fashion.

Means to solve the problems

In the case of the automatic exposure corrector of the present invention, in an automatic exposure corrector in which an appropriate exposure is applied to an optical image input received through a lens in order to obtain an image signal output, a luminance determination unit which identifies pixels having a high luminance in excess of a value prescribed in reference to the mean luminance near the center of the image among the respective pixels constituting the

aforementioned image signal output and outputs data on their positions, an LCD (Liquid Crystal Display) capable of filtering the areas for the aforementioned optical image input, regarding which the exposure is to be decided, which correspond to the aforementioned high luminance pixel position data, and an LCD controller which performs an operation to drive the filtering operation applied to the aforementioned high luminance pixels of the aforementioned LCD based on position data output from the aforementioned luminance determination unit are provided.

Application example

Next, an application example of the present invention will be explained with reference to the figures.

Figure 1 is a block diagram of an application example of the automatic exposure corrector of the present invention, and Figure 2 shows diagrams illustrating an example of the operation of the LCD with respect to the external optical image input in the application example in Figure 1. In Figure 1, the part indicated by the bold line is the part directly concerning the present invention, and the other contents have the same configuration as that in Figure 3.

An external optical image is input into polarizing prism 5 through lens 4. Polarizing prism 5 outputs the image signal into aperture mechanism 6 and splits the optical image input before outputting it into LCD 3 for exposure control. The split image signal output to aperture mechanism 6 is received at light-receiving element (CCD) 7 utilizing a CCD in order to obtain an image signal output. In the present application example, an analog image signal from light-receiving element 7 is also input into luminance determination unit 1, A-D conversion is applied by luminance determination unit 1 to said analog image signal pixel by pixel in order to convert it into digital image data, and peripheral pixels having a luminance higher than a prescribed value are detected/identified by in reference to the mean luminance near the center of the image. Luminance determination unit 1 outputs the data on the positions of said high-luminance pixels into LCD control part 2 as a control signal for a filtering operation.

Upon receiving the position data from luminance determination unit 1, LCD controller 2 drives LCD 3 so as to apply the filtering operation (mask) to the areas on LCD 3 which correspond to the areas specified by said position data. LCD 3 is placed between polarizing prism 5 and luminance determination unit 8 and operates to filter the optical image input from polarizing prism 5 to be exposed.

Figure 2 shows diagrams illustrating the filtering operation of the LCD in the application example in Figure 1. Figure 2 deals with optical image input 10 captured facing [bright] light; wherein, LCD 3 filters the peripheral portion with higher luminance than the value prescribed in reference to the luminance near the center of optical image input 10, and LCD 3 filtering area, that is, the portion indicated by the slanted lines, is masked through filtering. Luminance

determination unit 8 controls aperture mechanism 6 so as to attain the necessary exposure for photo-subject 13 near the center of the image even when it is captured facing the light, so that an image output signal 12 can be obtained under the appropriate exposure.

Effect of the invention

As explained above, because the prescribed value is provided in reference to the mean luminance near the center of the image and applied when filtering all parts of the image automatically in order to correct the exposure, the present invention offers an effect that an image signal output can be obtained at appropriate exposure in real-time without involving manual setting.

Brief description of the figures

Figure 1 is a block diagram of an application example of the automatic exposure corrector of the present invention, Figure 2 shows diagrams for explaining an example of the operation of the LCD with respect to the external optical image input in the application example in Figure 1, and Figure 3 is a block diagram of a conventional exposure corrector.

1 ... luminance determination unit; 2 ... LCD controller; 3 ... LCD; 4 ... lens; 5 ... polarizing prism; 6 ... aperture mechanism; 7 ... light-receiving element; and 8 ... luminance determination unit.

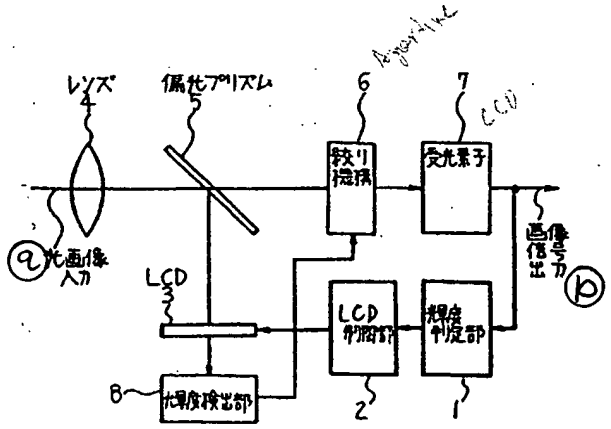


Figure 1

Key:
- a Optical image input
- b Image signal output
- 1 Luminance determination unit
- 2 LCD control part
- 4 Lens
- 5 Polarizing prism
- 6 Aperture mechanism
- 7 Light-receiving element
- 8 Luminance determination unit

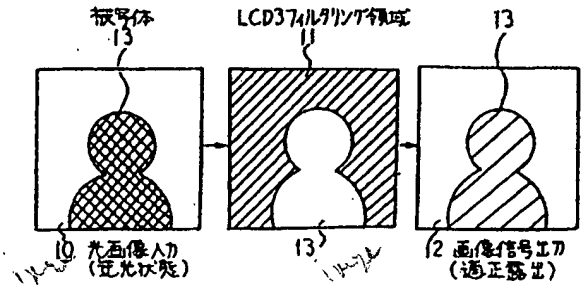


Figure 2

Key:
- 10 Optical image input (captured facing the light)
- 11 LCD 3 filtering area
- 12 Image signal output (appropriate exposure)
- 13 Photo-subject

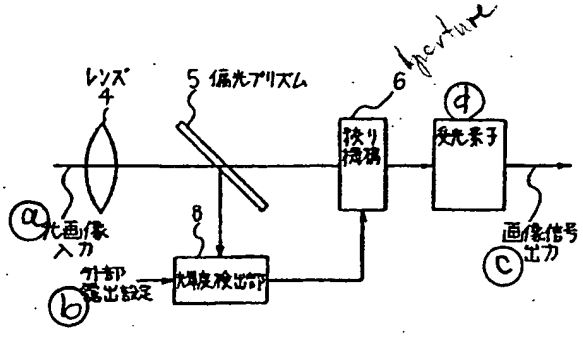


Figure 3

Key:
- a Optical image input
- b External exposure setting
- c Image signal output
- d Light-receiving element
- 4 Lens
- 5 Polarizing prism
- 6 Aperture mechanism
- 8 Luminance determination unit

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